

**WHAT IS CLAIMED IS:**

1. A method of manufacturing a semiconductor device having interconnects connected with a first diffusion region and a second diffusion region formed in a silicon substrate with being spaced a device isolation region from each other, comprising the steps of:

forming a high melting-point metal layer over an entire surface including over the device isolation region and the first and second diffusion layers;

selectively introducing a silicon element into the high melting-point metal layer on the device isolation region;

silicidizing by thermal treatment the high melting-point metal layer having introduced therein the silicon element on the first and second diffusion layers and the device isolation region; and

selectively removing the high melting-point metal layer to be silicidized remaining unreacted.

2. The method according to claim 1, wherein the high melting-point metal layer is a cobalt layer.

3. The method according to claim 1, wherein said introduction is done by an ion implantation method.

4. A method of manufacturing a semiconductor device

having interconnects for connecting a first diffusion region of a first MOS transistor and a second diffusion region of a second MOS transistor both formed in a silicon substrate with being spaced a device isolation region from each other, comprising the steps of:

forming a high melting-point metal layer on an entire surface including the first and second MOS transistors;

selectively introducing a silicon element into the high melting-point metal layer on the device isolation layer;

silicidizing by thermal treatment the high melting-point metal layer having introduced therein the silicon element on the first and second diffusion layers and the device isolation region; and

selectively removing the high melting-point metal layer to be silicidized remaining unreacted.

5. The method according to claim 4, wherein the high melting-point metal layer is a cobalt layer.

6. The method according to claim 4, wherein said introduction is done by an ion implantation method.